

# **Pharmaceutical Care and the Role of a Pharmacist in Space Medicine**

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# Learning Objectives

- Understand how pharmaceutical care is applied to Space Medicine operations.
- Understand the current involvement of a pharmacist in Space Medicine.
- Understand areas of future pharmacy involvement in space tourism.



# Definition

- **Traditional role:**
  - Pharmacists dispense the medication from a physician order to the patient
  - Ensure the safe and effective use of medication
  - Counsel patient
    - proper use
    - adverse effects



# Definition

- Developing Role:
  - Include other services related to patient care
  - Pharmaceutical care
- Drug therapy experts
- Primary health professionals
  - optimize medication management = positive health-outcomes



# Pharmaceutical Care

- Responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life.
- “The outcomes of traditional pharmaceutical care are: cure of a disease, elimination or reduction of a patient's symptomatology, arresting or slowing of a disease process, or preventing a disease or symptomatology”
- Terrestrially, a pharmacist is a major player in providing this care.



# Pharmaceutical Care in Space Medicine

- Space medicine primarily preventative medicine
- Outcomes of space medicine pharmaceutical care are:
  - Elimination or reduction of a patient's symptomatology
  - Arresting or slowing of long term effects from microgravity – or -
  - Preventing long term effects or symptomatology as a result of microgravity
- Space medicine pharmaceutical care is about both the patient and the mission



**Integration**

**Commercial  
Space Travel**

**Patient Care**

**Pharmacist**

**Drug  
Information**

**Pharmacovigilance**

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# Integration

**Commercial  
Space Travel**

**Patient Care**



**Drug  
Information**

**Pharmacovigilance**



# Pharmacy Integration

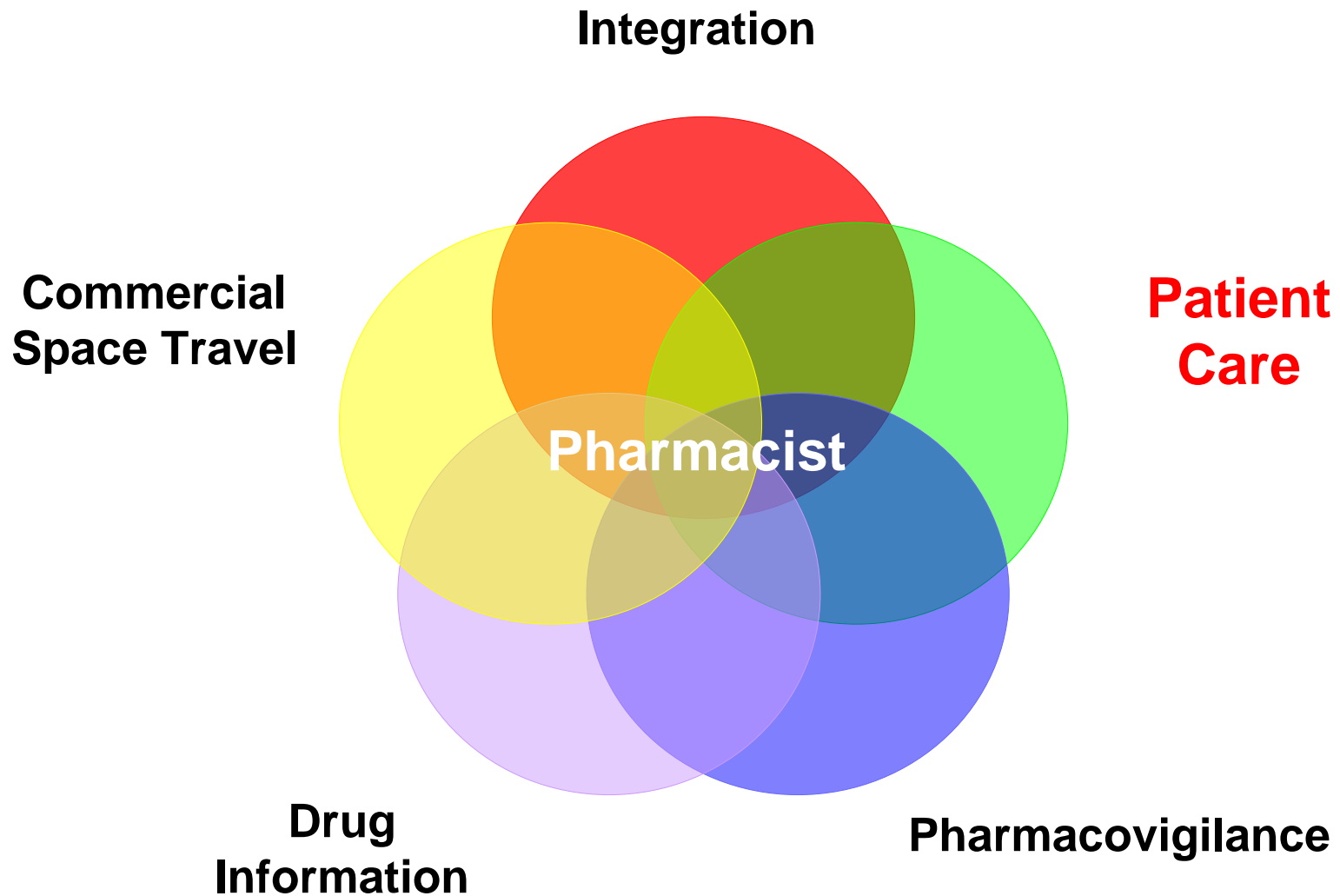
- Team member pre- spaceflight
  - Physician, engineer, human factors, biomedical engineer and pharmacist
- Patient care
- Patient safety issues
- Drug information
  - Medication kit design
  - Selection of medications for the International Space Station and Space Shuttle medical kits
    - More bang for your buck
    - Compatibility issues



# Pharmacy Integration

- Team member during spaceflight
  - Physician and pharmacist
    - Patient safety issues
    - Drug information
- Team member post-flight
  - Research support
    - Patient safety issues
    - Drug information

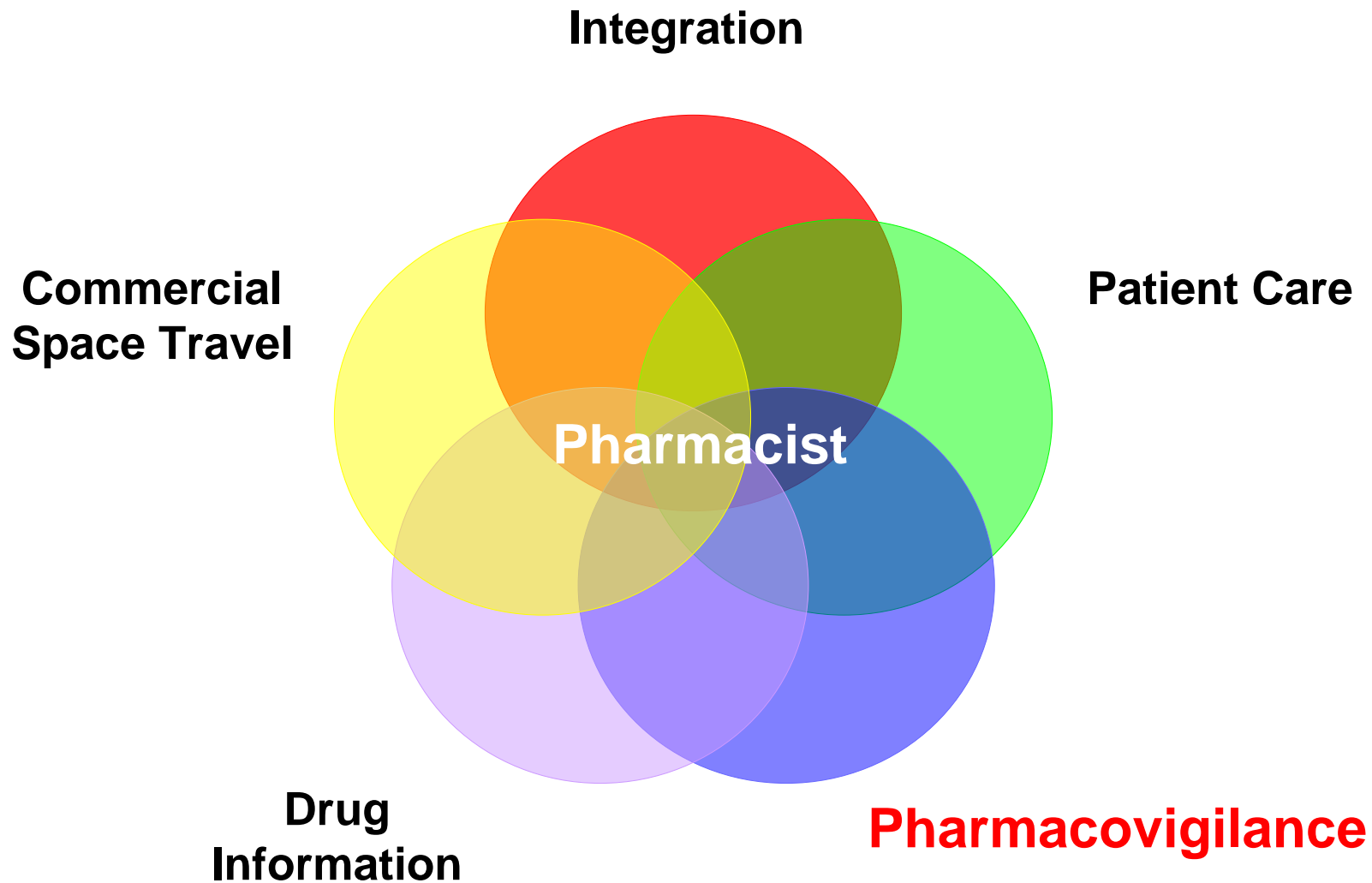




# Patient Care

- Preventative care
  - Drug Tolerance Testing
  - Countermeasure support
- Patient specific medication needs
- Patient Safety
- Drug Utilization Reviews

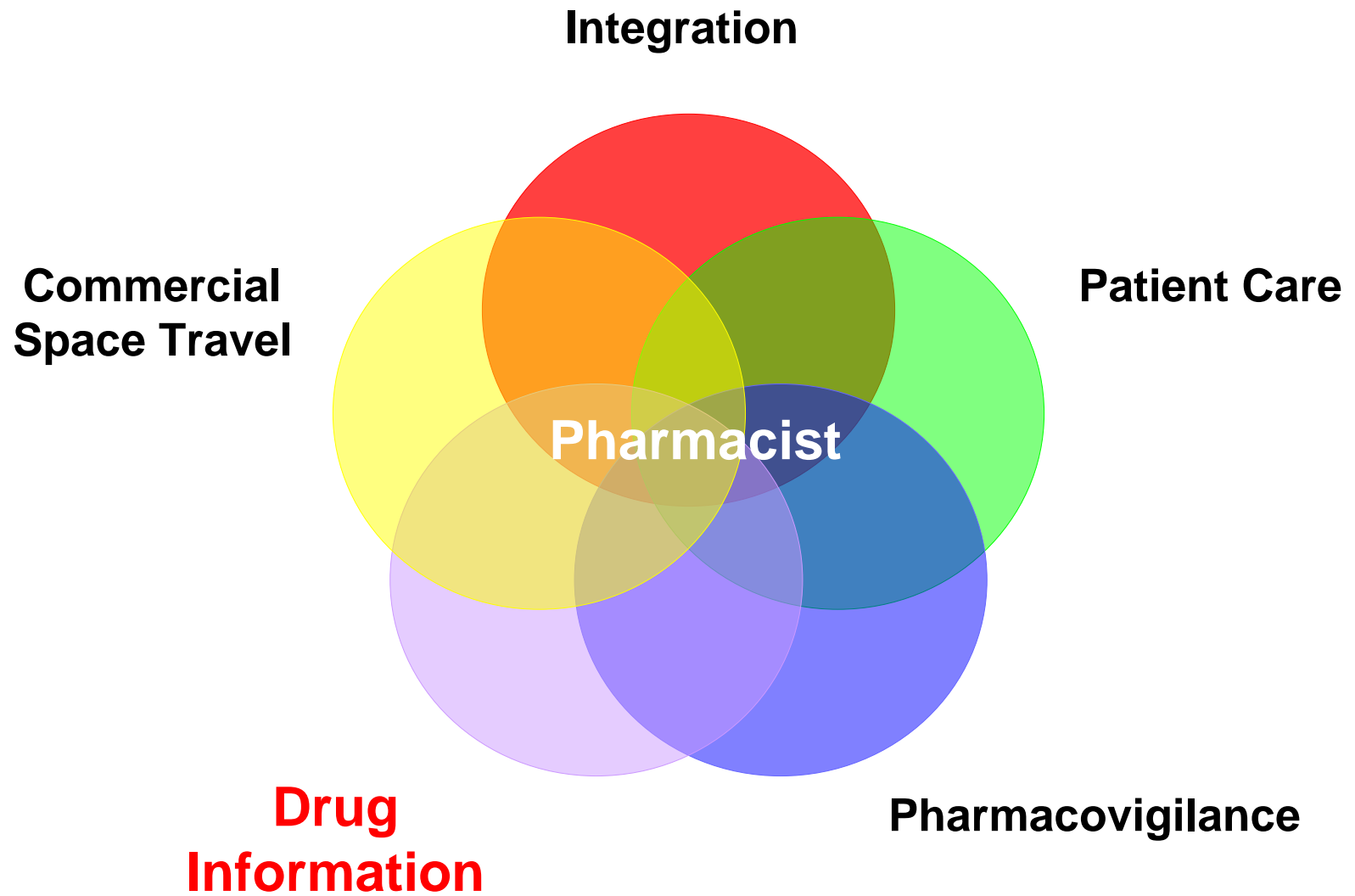




# Pharmacovigilance

- Kit inspections
- Storage
  - Transdermal patch
- Patient Safety
  - Drug Tolerance Testing
  - Drug recalls
  - Sound alike/look alike





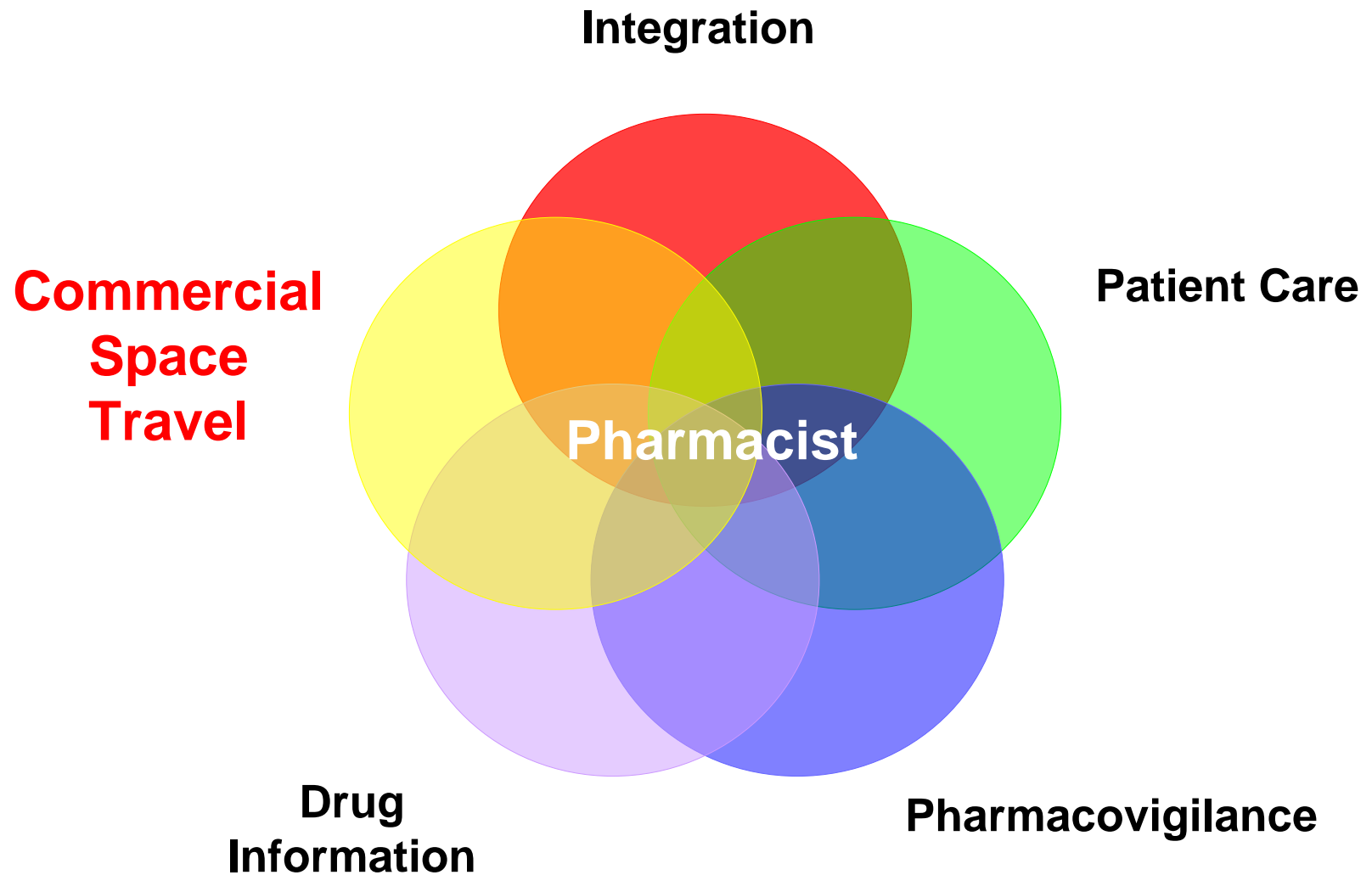
# Drug Information

*“Knowledge is power, communication is key”  
- unknown*

- Pharmacist involvement in medical checklist procedures
- Medication monographs
- Drug recalls
- Pharmaceutical technology update







# Commercial Space Travel

- Same challenges as existing system
- New variable added
  - State of civilian health
- Broader population base, all ages
  - Altered pharmacokinetics exist before space travel
  - Gender differences?
  - Alternative medicine consumers?



# Commercial Space Travel

- More health issues
  - >50 years of age will present chronic disease states
    - Dyslipidemia
    - Hypertension
    - Diabetes
    - Thyroid disorders
    - Decline in renal function
    - Decline in hepatic function
    - Osteopenia, osteoporosis
  - All require pharmacologic treatment
- More treatments, more consumables
  - Efficiencies can be researched



# Commercial Space Travel

- Becomes affordable
  - Physician's time will be in high demand
  - Pharmacist team member required
- Pharmacist required
  - Terrestrially - first point-of-contact for patients with health inquiries
  - Commercial space travel will be no different
- Plan a lunar trip, see the pharmacist for all of your motion sickness needs.



**Integration**

**Commercial  
Space Travel**

**Patient Care**

**Pharmacist**

**Drug  
Information**

**Pharmacovigilance**

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# Closing Statements

- Pharmaceutical care in the area of space medicine is evolving.
- A pharmacist serves a critical role in this care.
- Commercial space travel will require pharmacist involvement.





# Questions?

# References

- (<http://pharmacy.ouhsc.edu/about/information/pharmcare.asp>).

